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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE •

APRIL 13, 1935

Stone From the Sky

See Page 227

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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SCIENCE SERVICE

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Edited by WATSON DAVIS

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DO YOU KNOW?

In line with its policy of self-sufficiency, Germany is recovering sulphur from fuel gases, as a by-product at coke ovens.

The number of persons killed in accidents last year in this country was 5,000 more than the entire population of Nevada (94,000).

Young men in the Civilian Conservation Corps have been gaining, on the average, from seven to eleven pounds during the first two months in camp.

The amount of lead residue from poisonous insect sprays permitted on apples and pears shipped in interstate commerce has been reduced by the Government.

Paul Revere made the important contribution to American science and industry of discovering by experiments how to make copper malleable enough to be hammered hot, a secret previously guarded by a few British manufacturers.

The Dutch elm disease, which is menacing America's elms, may hide in trees for ten years without visible sign.

The idea of building city streets on two levels was an engineering problem that attracted the great artist Leonardo da Vinci.

It is reported from Germany that a new process has been found for copper plating on aluminum so as to produce a desirable coating without electrolysis.

A chance seedling on a West Virginia farm has become a new apple variety, Golden Delicious, which West Virginia considers a notable contribution to the apple industry.

Montezuma's palace in Mexico was described by the Spanish invaders as having a hundred bedrooms and a hundred baths—heralding, says one British anthropologist, the "great American ideal."

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the articles.

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PSYCHOLOGY

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How can physicians look within the human body and see the organs in their proper perspective? p. 227.

ZOOLOGY

Which is faster, stallion or mare? p. 230.

CHEMISTRY

Rare Heavy Oxygen Water Made by British-German Team

Demonstrate New Apparatus Designed to Produce Four Tenths of a Drop a Day of the Precious Liquid

WHAT is probably the world's rarest liquid, "heavy oxygen water," is now being produced at Manchester University, England, by means of a recently constructed diffusion apparatus.

Only a few drops of the heavy oxygen water exist. The new apparatus in which Lecturer J. B. M. Herbert and Prof. M. Polanyi of Manchester University demonstrated the production of heavy oxygen water is designed to produce 20 milligrams of the water per day, which is about four-tenths of a drop.

One atom out of every hundred of the oxygen atoms in heavy oxygen water has a mass of eighteen instead of the usual mass sixteen of ordinary oxygen. In ordinary water the normal proportion is about one in 500. Scientists consider this concentration of the heaviest oxygen as a real achievement since the difficulties are much greater than in separating the famous three kinds of hydrogen recently discovered.

Prof. G. Hertz of Berlin made the world's first sample of heavy oxygen water and presented the precious ten drops (half a gram) to Prof. Polanyi, who was formerly professor of physical chemistry at the Kaiser Wilhelm Institute in Berlin. The isotopes or atom varieties of neon, gas now used in electric signs, were also separated by Prof. Hertz.

Very Complex

The Manchester University apparatus for producing heavy oxygen water is very complex and consists of nine mercury vapor diffusion pumps circulating gas through porous clay called steatite. The very slight difference in weight between the light and heavy oxygens in the water vapor makes the concentrating process slow and tedious. Even compared with its use upon gases like neon, the process is slow because the water vapor condenses upon the surfaces of the clay tubes.

Mr. Herbert explained that higher concentrations of heavy oxygen water could be obtained either by repassing or by using a large number of diffusion units. Five per cent. concentration is obtainable by the use of diffusion. By a combination of methods, Mr. Herbert believes that in time pure 100 per cent. heavy oxygen water might be obtained. But it would probably take years to achieve this goal.

Prof. Polanyi is at present in Moscow where he is consulting with Soviet scientists engaged in similar work.

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ASTRONOMY

Giant Meteorite Found In Southwestern Kansas

See Front Cover

A HUGE "stone from the sky," a stony meteorite believed to be exceeded in weight by only one other in the world, has been added to the Nininger meteorite collection in the Colorado Museum of Natural History in Denver. Its dimensions are 35 by 22 by 21 inches and it weighs an estimated 700 pounds, plus an additional 50 pounds of broken-off fragments.

The clue that led to its discovery was supplied by J. D. Lynch, Jr., a senior at Hugoton High School. Hugoton is the county seat of Steven County, in southwestern Kansas.

Prof. H. H. Nininger, researcher on meteorites, recently lectured before the Hugoton student body, exhibiting samples of the pitted lumps of iron and stone that occasionally fall from the heavens. Mr. Lynch recognized one of these as similar to a stone that a few years age crumpled a plowshare for him while he was working in the field. He told Prof. Nininger of the occurrence, and the two, with the latter's young son, Bob, went to the spot where the offending stone had been thrown to get it out of the way.

It proved to be meteoric, but only a fragment of an evidently much larger mass. A search in the field soon turned up a stony meteorite at a maximum depth of 36 inches. It is evidently a very old fall, but there is at present no way of determining its exact date.

Prof. Nininger and Mr. Lynch dug it up, together with a number of fragments, and prepared it for shipment to the Museum in Denver. Mr. Lynch is shown in the front cover picture, wrestling with the great stone in its pit.

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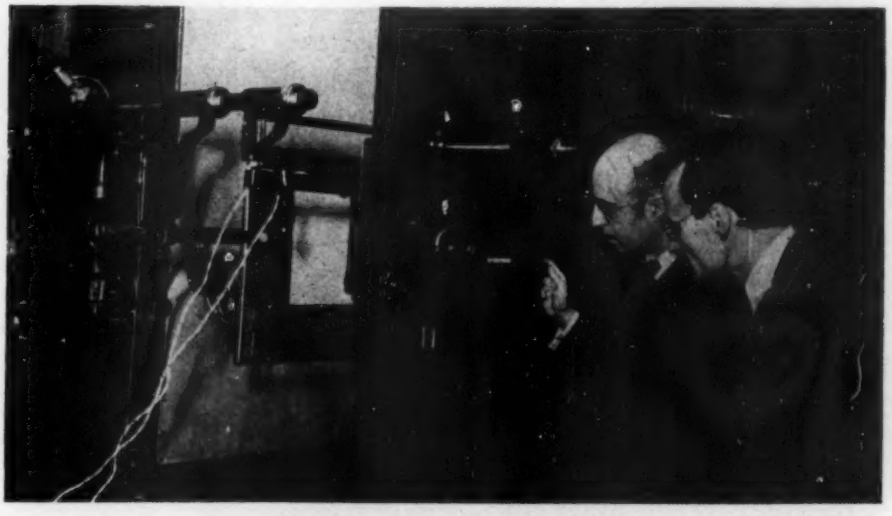

THREE-DIMENSIONAL X-RAY

A new aid for diagnosis, a means of viewing a patient in three dimensions by X-rays, has been invented by Dr. O. Russo, physicist at the State Roentgen Institute, Moscow, U.S.S.R. Dr. Russo (left) is demonstrating to Dr. E. Hamburger, director of the Institute, his new stereoscopic viewing mechanism with which it is possible to view the internal organs of a patient as he swallows, coughs or breathes. Instead of seeing the organs as shadows in silhouette, the doctor sees them in the same relative position as they have within the body in real life.

MEDICINE

Story Of Three-Year Sleep Told For First Time

Experimental Treatments, Including Transfusions, Serum, and Induced Fevers and Chills are Described

FOR the first time, the medical story of Patricia Maguire, the Oak Park, Ill., girl who has been sleeping for more than three years, is being told. Her family physician, Dr. Eugene F. Traut of Oak Park, has written his first report of the case. (*Journal of the American Medical Association,* April 6)

Although Miss Maguire has been asleep for more than three years, she has not broken the record for long-distance sleeping. Sixty-four other cases of prolonged somnolence have been reported, the editor of the medical journal points out, and some of them have been of longer duration than Miss Maguire's famous case. In her case, the period of complete somnolence was brief, the patient soon responding in some way to questions.

Miss Maguire went to bed on February 15, 1932, Dr. Traut's records show. This was ten days after she had first visited the doctor's office complaining of her inability to keep awake on elevated trains and of drowsiness at work.

Within three weeks from that first visit, she became irrational and was unable to swallow. Her temperature rose, her pulse quickened, she became rigid and there were other evidences of acute epidemic encephalitis, more commonly known as sleeping sickness. For two months the young woman had to be fed by a rubber tube through the nose. Her daily diet at that time consisted of four coddled eggs, one pint of milk, one pint of cream, the juice of six oranges, cooked cereal, thin custard, vegetable soup, brewers' yeast and, after her fever subsided, cod liver oil.

Her ability to swallow then returned, and she is now fed with a spoon.

Eleven months after she became ill, Miss Maguire had recovered sufficiently to stick out her tongue when the doctor asked her to. About that time she contracted pneumonia and for a time had to be placed in an oxygen tent. She convalesced from the pneumonia after serum treatment.

Then followed a long period of experimental treatments. She had a blood transfusion from her healthy stepfather. Injections of serum from two persons who had recovered from encephalitis eight or ten years previously were given her twice a week for several weeks. After this she became more alert. Other treatments were tried—iodine injections, weekly chills induced by typhoid vaccine, fever treatments in heated cabinets and numerous other measures, none of which had any apparent effect.

For the last seventeen months, Dr. Traut has noted signs of returning intelligence. Miss Maguire is in a stupor about 80 per cent. of the time between 5 a. m. and 8 p. m. During the night she is apparently in a deep natural sleep.

Most of the time during the day the young woman lies with her eyes closed, her arms tensely bent and her fingers clenched. She rolls about and groans.

His widely-publicized patient will now raise her hand or smile if she is asked to, the doctor reports. She will read and follow the same commands if they are written on a slate. When asked how many of five apples remain after two have been sold, she raises three fingers. Recently she has held her head up while sitting.

Her mother's requests get the best response; evidently she is able to distinguish her mother from other persons.

Dr. Traut describes Miss Maguire's present appearance as that of a well nourished person with good color. Her muscles, he says, are large and strong. Her temperature and pulse are normal. Her right leg has gradually become half an inch shorter and her right thigh is one inch less in circumference than the left.

CHEMISTRY

Good Anti-Knock Gasoline Made From Coal in Germany

THE FAMOUS German I. G. chemical works of Oppau-Ludwigshafen have just completed a three months' trial run with a continuous process for making gasoline from coal. A thousand kilos (450 pounds) of coal yielded 600 kilos (270 pounds) of gasoline of good anti-knock quality.

Using the Bergius process of hydrogenation, powdered coal and heavy oil are mixed in a chamber with catalysts under a pressure of three hundred atmospheres and 460 degrees centigrade temperature.

Pressed by the lack of petroleum products within its boundaries and the lack of colonies which might produce petroleum, Germany for years has continued gasoline-from-coal research. The present trial run is one of the largest ever completed.

And Great Britain, just across the North Sea, has gone into the field, not because its colonies do not yield oil for gasoline, but to encourage the industry in event of war. The British Navy buys large amounts of British gasoline made from coal and low grade oils at high prices to subsidize the industry and keep it going.

Gasoline from coal and low grade oils is technically possible but hardly profitable in America. It costs at least three times as much at the factory for a gallon of coal-made gasoline as for a gallon of the current American gasoline now on sale here.

With the warning of the U. S. Geological Survey that present petroleum reserves, if used at present rates, will last only another thirteen years, government scientists suggest, at every opportunity, that the United States should enter into a study of coal gasoline. The U. S. Bureau of Mines, while not doing this type of research at present, has the problem near the top of its list and will undertake investigations when very modest funds are appropriated.

From the American standpoint the main problem still to be solved is the optimum conditions for using American coals, which differ decidedly from European coals.

Already American oil companies have devised processes whereby low grade petroleum can be turned into superior gaso-

line. The next step would be to use the tarry products from petroleum distillations for the same purpose. And finally would come the use of coal dust itself.

While America has not the immediate economic pressure for starting coal dust gasoline research, a decade hence the situation will be different. Government scientists, foreseeing this day, are itching to get at the preliminary work so that when the time comes they can present a whole program to relieve the problem. At present what work has been done in the United States has been mainly in university laboratories, so much so, in fact, that the problem is principally of academic interest.

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BIOLOGY

Efforts to Grow Baby Rabbits in Glass Fail

Attempts at Ectogenesis Are Temporarily Checked Because Hormones Act Only Through Mother's Body

ATTEMPTS at ectogenesis or "babies born in a bottle" have been checked, temporarily at least, because certain hormones necessary to the early growth of the egg and embryo act only indirectly through the mother's tissues.

Discovery of how these four essential hormones act was made by Prof. Gregory Pincus of Harvard University. Prof. Pincus' success in fertilizing rabbit eggs in a test tube, announced last year, attracted wide notice as a first step toward ectogenesis, a process long dreamed of by romantically-minded scientists. In this earlier experiment the eggs were fertilized in a test tube and then brought to birth within the body of a foster mother rabbit. (*SNL, March* 10, 1934)

His latest efforts were directed toward the next step, continuous growth of the eggs and embryos outside the mother, a feat as yet unaccomplished by scientists. Prof. Pincus tried to do this by adding certain gland products to the material in which the eggs were placed for growth outside the mother's body.

These are thyroid and pituitary hormones which affect the maturing of the egg in the ovary; oestrin, a primary female sex hormone affecting the later growth of the eggs; and progestin, a female sex hormone affecting the growth and implantation of the eggs in the walls of the uterus.

Allowing the egg to develop normally and removing it from the mother's body after it had become implanted on the walls of the uterus, Prof. Pincus succeeded in keeping the embryo alive in a culture dish for about 48 hours. At this stage blood vessels began to form and the heart began beating but all attempts to keep the embryo alive beyond 56 hours after separation from the mother failed.

Adding to the culture the hormones which brought the embryos through the same periods in the mother's body was also unsuccessful.

From the fact that the cultures still die at the same critical points, even after the hormones had been added to their nourishing growth medium, Prof. Pincus concluded that the hormones act on the eggs and embryos through the maternal tissues rather than on the eggs directly.

Prof. Pincus' attempts to grow the eggs outside the maternal body failed at the critical point in the development which has blocked previous attempts by other scientists. Normal cleavage of the cells followed fertilization and continued until 128 cells were formed.

At this point, when a cavity is ordinarily formed within the ball of cells and the embryo begins its growth, development outside the mother's body became abnormal and the entire organism collapsed with irregular growth.

Further efforts to perfect a culture which will allow the eggs to get past the critical stage at which science is now stopped are progressing along three lines. In the first, the mother is injected with each of the hormones and the effects on the egg studied. Varying strengths of solutions of the hormones are being added to the cultures to learn possible effects in another method. Still a third line of attack takes the eggs placed in cultures or those of injected mothers and places them in new mothers. Results of these efforts are not yet available, since the research has just begun.

While other scientists have conducted research on the effects of sex hormones on female reproductive organs, Prof. Pincus' experiments are among the first to study the effects of these hormones on the egg itself.

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PHYSICS

Lamps "Work Themselves To Death" to Overcome Fog

FOG, worst enemy of seafaring men approaching harbor, can be fought with a new weapon now. What and how, was described before a joint meeting of the American Physical Society and the Optical Society of America, in session at Columbia University.

The new trick in fog-conquering is to operate the electric lamps in lighthouses at much more than their normal voltages during foggy periods. Gjon Mili, engineer of the Westinghouse Electric Lamp Company, disclosed that the bureau of lighthouses, U. S. Department of Commerce, has been

TESTING FOR LIGHTS

Gjon Mili is measuring, with a foot-candle meter, the intensity of light passing through a chamber filled with fog in the laboratory of the Westinghouse Lamp Company.

making extensive tests with such over-voltage lamps. Working with lamp engineers, the lighthouse bureau's experimenters have already proved that in a fog where one can see the light for only 400 feet, it is possible to increase the visibility of a lighthouse lamp or airway beacon to six times that distance, 2,400 feet, and that this feat is possible without changing the small, fifty-candlepower lamp now used.

The new line of attack on the fog problem, Mr. Mili said, came about because of past failures with various experiments to get added light transmission with colored beams.

"For years," he stated, "engineers sought a new source or color of light that would penetrate fog at a distance safe for aerial and marine navigation. Only recently, however, have engineers thought to increase the brightness of marine signal lamps by operating them over-voltage and utilizing reflectors and lenses to intensify the candlepower in the light beams.

Working lighthouse lamps at higher than the normal 110 volts as used in the home cuts down the life of the lamps, which is now standard at 1,000 hours. In the interest of economy, lamps should be operated at their normal rating of voltage, but in the interest of safety to human life and property engineers have come to the conclusion that they might well be made to shine brighter during fog intervals, even at the expense of a reduced life period.

With a fifty-candlepower lamp a slight step up in the voltage makes it emit 500,000 candlepower. Beams of upwards of 1,000,000 candlepower can be obtained from present type lamps by over-voltage and properly designed reflectors, Mr. Mili said.

It is possible, he continued, to work out compact auxiliary apparatus for lighthouse lamps whereby they will run at normal or subnormal voltage in clear weather and "work harder" during fog periods. This would even be possible on light-buoys far from shore, which operate on batteries.

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PSYCHIATRY

Research Will Add to Present Knowledge of Mental Disease

SHUT off from the world of normal persons by a thick curtain of ignorance are over 150,000 unfortunate men, women and children. They are the victims of mental disease, specifically of that most common and most tragic of all mental ills, *dementia precox*.

Striking its victims just as they are attaining maturity, this disease dooms most of them to a lifetime of wretched existence. Only about two out of every hundred afflicted recover sufficiently to take their places again in the world of the sane. The rest languish in institutions, growing more and more feeble mentally until they reach a stage of almost complete mental deterioration and general helplessness.

The curtain that shuts these unfortunates off from the rest of the world is our ignorance: ignorance of what goes on in their troubled minds—because at first they will not and later cannot tell us—and ignorance, consequently, of how to help them or of how to ward off the disease in susceptible persons.

Hope of getting behind this curtain of ignorance lies in research. Some studies are already being conducted at various institutions throughout the country where the unfortunate sufferers from *dementia precox* are confined.

Merely supporting and caring for these helpless patients, however, is so great a burden that very little money has been available to finance scientific study of their condition and investigation of its causes.

It now appears that scientists may get behind the curtain faster and more quickly find the ropes to lift it. A fundamental attack on this most baffling problem of mental medicine is being launched thanks to the far-sighted benevolence of the Scottish Rite Masons of the northern jurisdiction of the United States. A preliminary fund of $15,000 has been established to begin the work and more will be made available during the coming year.

Plans call first for locating the scientists, hospitals and laboratories already engaged in research in this field with a view to supporting promising research that is already under way or of finding fresh leads for study and likely persons to engage in new projects. This preliminary survey of the field is being made by Dr. Nolan D. C. Lewis, who is on leave from St. Elizabeth's Hospital, Washington, D. C., for this purpose. Dr. Lewis has for many years been director of laboratories at this large government institution for the care of the mentally ill.

The initial $15,000 fund is to be administered by the National Committee for Mental Hygiene. The entire project is in charge of a special committee composed of some of the foremost American leaders in the field of mental disease.

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ZOOLOGY

Male Horses Speedier Than Mares and Fillies

PUT your money on geldings or stallions rather than mares and fillies when the race is an open competition.

The best of the females is still inferior to the best of males in running ability, says Prof. Calvin P. Stone, Stanford University (*Journal of Comparative Psychology*, Feb.) Prof. Stone studied the sex differences in the speed of thorough-bred horses from the records available for the years 1908 to 1932 inclusive.

In the stake races, which are crucial tests of speed, stamina and racing temperament, he found that only 22 per cent. of the winners were females during the period 1923 to 1929, when 2,400 consecutive stake races were run on the best-known American tracks. This figure is still too high, because some of the races were restricted to one sex. In 1932 mares and fillies won 24 per cent. of all the races but only 19 per cent. of those in open competition with male. The ratio of 1:4 properly indicates the relative frequency of winning by males and females in this type of race.

Apparently when records are made the male horse is far more likely to make them, for 86 per cent. of all racing records established from 1908 to 1932 were made by stallions and geldings. Fifty distances from one quarter to four miles were studied. Moreover, when it comes to running a mile in less than one minute and 37 seconds, a performance that has only been done 170 times during this period, it was found that 138 of these records, or 81 per cent., were made by males.

No female has ever run a mile in 1:35 or less, whereas four males have achieved this impressive speed. Equipoise did it in 1:34.4 with an impost of 128 pounds. The female impost is nearly always lighter than the male.

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MEDICINE

Mice Get Cancer Immunity From Tumors in Skin

A WAY to produce immunity to cancer has been reported to the French Academy of Sciences by Prof. Alexandre Besredka and Dr. Ludwik Gross of the Pasteur Institute (*Comptes Rendus,* Feb. 25)

The method applies to mice, not men. Human application of this method is not now possible and may never be. The study, however, advances knowledge of cancer and its ways. It may perhaps prove to be an important forward step in the fight against this great killer of man.

The cancers in this study were artificially produced in the mice by inoculating the animals with a certain kind of cancer cells. In the course of their study, Prof. Besredka and Dr. Gross found that inoculation within the skin of the mice gives vastly different results from inoculation under the skin.

The latter method, inoculation under the skin, has been common practice and invariably the tumor which followed has ended in the death of the mouse, often with a tumor the size of a large nut. Inoculation into but not under the skin, however, produces a tumor which grows to about the size of a pea and then disappears gradually leaving the mouse healthy.

Further tests on these mice which had completely recovered revealed the fact that they could not be given another cancer, even by inoculation under the skin. They had acquired cancer immunity, a long-sought goal which would be a priceless boon to humanity.

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PHYSICS

Radium Substitute Made In Greater Quantities

RADIOSODIUM, hailed as a possible substitute for natural radium in yielding radiation useful in cancer treatment and industry, is now being produced "in somewhat greater quantities than reported several months ago" when Prof. Ernest O. Lawrence of the University of California made known his discovery. (*SNL, Oct.* 27, 1934.)

Because sodium as a constituent of common salt is one of the most common things in our daily life and because salt solution can easily be injected into the blood stream, scientists expect the new radiosodium to have practical applications in the future.

Prof. Lawrence makes radiosodium by bombarding sodium with the charged hearts of double weight or heavy hydrogen, called deutons. When the deutons are flung with an energy of 1,750,000 electron volts, sodium gamma rays are given off from the new radiosodium formed with energies of 5,500,000 electron volts. These are the world's most penetrating gamma rays. Even more important, the radiations continue to be given off for 15 hours.

British scientists have just discussed enthusiastically the possibilities of using radiosodium, although it is recognized that immediate use of this new substance may be delayed by high cost of production.

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PALEONTOLOGY

Baluchitherium Bones Built Into Synthetic Giant

HUGEST of all mammals that ever walked on land, *Baluchitherium* must have been an awesome figure in the dim forests of 40 or 50 million years ago. This enormous beast, distant relative of the modern rhinoceroses, stood 17 feet 3 inches high at his shoulders, according to new estimates prepared at the American Museum of Natural History in New York. Drs. Walter Granger and William K. Gregory assembled all available bones, representing several individuals, filled in parts that were still absent, and prepared the restoration sketch of the presumptive fleshy outline over the restored skeleton which is reproduced below.

Baluchitherium was a member of the great animal group called the titanotheres, which rose, flourished, declined and disappeared in the earlier days of the Age of Mammals. Prof. Henry Fairfield Osborn, formerly president of the American Museum of Natural History, is author of a notable monograph on these "Titan-beasts."

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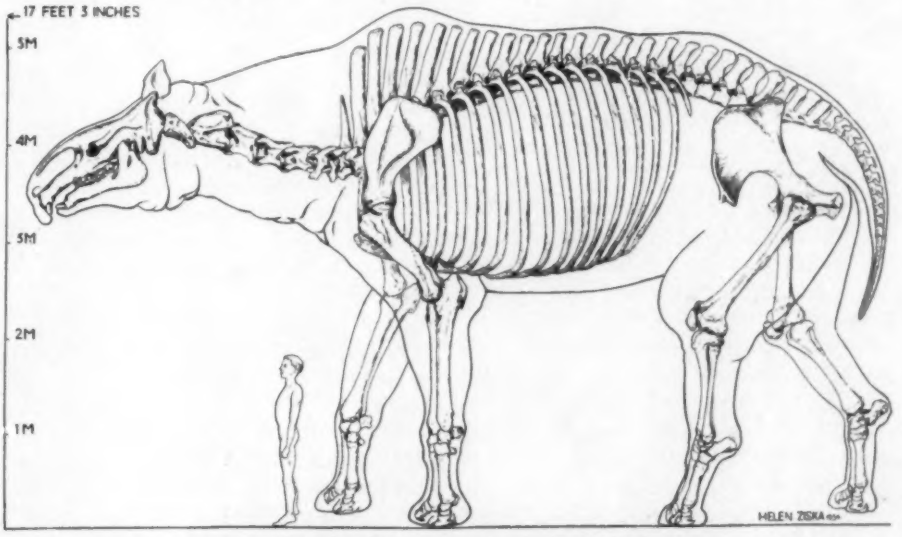

HUGEST MAMMAL THAT EVER WALKED

Dwarfing even the gigantic Ice Age mammoths, Baluchitherium was the biggest mammal that ever lived on land. This new restoration sketch, with a six-foot man drawn in for comparison, was prepared at the American Museum of Natural History.

FORESTRY

Rubber Stamps Used For Marking Forest Trees

RUBBER stamps are usually thought of mainly as standard equipment for the desks of businessmen and bureaucrats; but they are also proving useful in one of the most rugged of outdoor professions, forestry.

It is necessary in certain scientific studies of tree life to give large numbers of trees identifying marks. This has been done hitherto by nailing punched metal tags to their trunks. Lately, however, large rubber stamps have been coming into use, "inked" with white paint or enamel.

In the *Journal of Forestry* (April) the relative advantages and disadvantages of the rubber-stamp method are discussed by H. F. Morey and Paul W. Stickel, of the Northeastern Forest Experiment Station, New Haven, Conn.

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ARCHAEOLOGY

Spot Where Spartans Made Last Stand Discovered

THE EXACT spot where one of the most heroic hopeless battles of the world was fought has been located, after many centuries of guessing, by a German and a French archaeologist, working independently of each other.

The location of the pass of Thermopylae, where the little Spartan "batallion of death" under their lion-leader, Leonidas, held at bay the uncounted thousands of Persians in the army of Darius, has long been known. But just where the last handful of Spartan warriors thrust and hacked until the last man fell was not known.

The Greek historian Herodotus tells of a mound or small hill where the body of Leonidas was found. On this hill the later-liberated Greeks erected a monument to the memory of their hero, flanked with two lions looking toward the north, whence the Persian foe had come. But there were six such little hills in the pass, so that for generations archaeologists have been carrying on a grand guessing contest.

A few years ago, Dr. Friedrich Stählin of Nürnberg made careful survey of the historic battlefield, and decided which of the six hills must be the site of Leonidas' last stand. Recently a French archaeologist, M. Béquignon, working quite independently of Dr. Stählin's earlier results, hit upon the same hill. M. Béquignon carried through a program of excavation, and came upon the foundation of the Leonidas monument. The two lions, however, had disappeared.

Dr. Stählin tells of the two investigations in the German journal *Forschungen und Fortschritte.* (March 20)

Science News Letter, April 13, 1935

PLANT PATHOLOGY

Hydrogen Peroxide Rids Seeds of Disease Spores

PEROXIDE of hydrogen has other uses besides the preparation of synthetic blondes. It can be used for the betterment of garden and field crops.

Director L. Portheim and Dr. J. Kisser, of the Vienna Science Academy's biological research institute, have found that a strong solution of hydrogen peroxide will rid many kinds of seeds of the disease-causing fungus spores that cling to them and start trouble when they are planted. They had best success with such seeds as peas, beans, corn and tomatoes; less with rye, barley, cabbage and sugar-beets. Experiments are being continued, to improve the results with the latter group of seeds. (*Die Umschau,* Mar. 24)

Science News Letter, April 13, 1935

CHEMISTRY

Soviets Extract Oil From Peat

ABOUT eight gallons of liquid fuel can be obtained from one ton of peat under laboratory conditions, according to results obtained at the Leningrad Industrial Institute. The fuel is a mixture of gasoline, kerosene, crude oil for diesel engines, etc. It is claimed that the fuel so produced costs only half as much as the usual type obtained from oil, and is in some cases superior in practical value, particularly the fraction used in diesel engines.

The U.S.S.R. considers the resuits obtained in this field of great importance, in view of the large deposits of peat in Leningrad province.

A comparative test of the new fuel, side by side with ordinary gasoline, for use in motor cars, is under way and a test run is being made from Leningrad to Moscow in which some of the cars will run entirely on gasoline made from peat.

Science News Letter, April 13, 1935

IN SCIE

ANTHROPOLOGY

Skulls Not Reliable Guides to Race

SKULLS are not the infallible indices to race which scientists once thought they were, declares Dr. Ales Hrdlicka, curator of physical anthropology of the Smithsonian Institution. They change in shape and relative dimensions within a few generations if the life environment of a people changes. And if you can get a large enough series of them you will find that there is no such thing as a line of racial discontinuity; they grade off insensibly into other skull types in all directions.

Assertions that the Scandinavian region was once inhabitated by a negroid people, and that modern Eskimos are like Europeans of 14,000 years ago, based on the study of skulls, Dr. Hrdlicka characterized as erroneous.

The changeability of skull shapes in modern times is well illustrated by the 12,000 Indian skulls in the National Museum collections, which have been carefully studied by Dr. Hrdlicka. He finds that since they left their old hunting ways for the comparatively sedentary life of the reservations, American Indians have been getting stouter, setting up certain muscular strains that in turn have caused slight but statistically important changes in the skull shapes. Furthermore, the deterioration of Indian teeth in the past few generations has been bringing about changes in their jaws.

Science News Letter, April 13, 1935

CRIMINOLOGY

German Women Murderers Always Use Poison

GERMAN women who commit murder are always Borgias. They invariably choose poison as the means of causing death, R. Heindl found from a study of crime statistics of recent years. In every case in which a revolver, knife or other weapon was used, the woman was not alone in her crime but had a male accomplice.

Science News Letter, April 13, 1935

FIELDS

INVENTION

New "Shorthand Machine" Writes Whole Words

WHOLE words of plain language, instead of symbolic groups of letters requiring a professional operator to interpret, are the product of a new German "shorthand machine." It is similar to the one known in America under the tradename "Stenotype," except for that feature, which enables the "boss" to read his secretary's notes as fast as he dictates them to her.

The German contrivance has 65 keys, on which the operator strikes all the letters in a word at the same time, using all fingers, piano-chord fashion. Thus a word of ten letters or less can be written at a single stroke. If there are more than ten letters, the operator strikes as many syllables at the first stroke as possible, and then the rest of the word on the next.

The words are printed one above the other on a strip of paper like adding-machine paper, which feeds up one line after each stroke. The letters are usually not uniformly spaced in the words, as in print or typescript: "brief" appears as "b r ie f," and "script" as "scr i p t." But the words are still easily readable by anyone. Except for the matter of convenience and esthetics, the typed tape itself might be mailed instead of having a transcript made on the typewriter.

Science News Letter, April 13, 1935

GEOPHYSICS

Elastic Rock Layers Found 35 Miles Down in Earth

ELASTIC layers of rocks, their cracks and pores ironed out by the tremendous weight of the earth's crust, are believed to exist 35 miles down from the earth's surface, according to preliminary results of experiments now in progress at Harvard University.

In an attempt to explore the composition of the earth's crust in regions so deep that they can in all probability never be examined by drilling holes, Dr. Albert Zisman has conducted research on the contraction of rocks under tremendous pressures ranging up to more than six tons per square inch.

Laboratory tests have been conducted thus far on granite, norite and other common rock formations. Cores are cut from solid rock in three directions, perpendicular to each other, and placed in a closed chamber full of kerosene, where the pressure is applied. Delicate apparatus is used to measure minute changes in the size of the cores under pressure.

Checks on Dr. Zisman's figures by field tests were conducted by Dr. L. Don Leet, director of the Harvard Seismological Station by dynamite explosions in places where the composition of the earth's crust is known. Vibrations set off in this manner travel not only along the surface but go deep into the ground and bounce back again to the surface at various distances from the source. Portable seismographs were used and computations on the velocities of the vibrations recorded in this way were made to indicate the elasticity of rocks at certain depths. Very close correlation was found between the results of the laboratory and field experiments.

Science News Letter, April 13, 1935

PHYSIOLOGY

Wins Prize for Research On Sex Hormone

DR. WILLARD M. ALLEN, young chemist of the University of Rochester, will receive a bronze medal and a prize of $1,000 for his research on progestin, one of the female sex hormones, the American Chemical Society has announced.

Working with Prof. George W. Corner of the University of Rochester and later with Dr. O. Wintersteiner of Columbia University, Dr. Allen succeeded in obtaining the sex gland product in pure form. This particular hormone has the function of preparing for the development of the offspring while in the embryonic stage. Dr. Allen's research was the basis of the discovery of the hormone's chemical formula, recently announced by two German scientists, Dr. K. H. Slotta of Breslau and Prof. Adolf Butenandt of Danzig.

The prize, which will be presented during the meeting of the American Chemical Society the week of April 22, was given by the Eli Lilly and Company Dr. Allen will be the first recipient of this newly-established prize award.

Science News Letter, April 13, 1935

PHYSIOLOGY

Heavy Water Slows Rate of Heart Beat

"HEAVY water," with a fifth of its hydrogen the now famous double weight variety, slows the rate at which the heart beats and should provide a method for controlling the rate of other body processes, Drs. T. Cunliffe Barnes and J. Warren have found in experiments conducted at the Osborn zoological laboratory at Yale University.

This is the latest study on the controversial question of whether or not heavy hydrogen (deuterium to chemists) is harmful to life.

The Yale investigations were made on frogs' hearts removed from the bodies. The investigators do not state (*Science*, April 5) whether this slowing effect of heavy water would be apparent in humans drinking it.

Studies of heavy water's effect on the body should be made on experimental animals, until more is known about it, in the opinion of its discoverer, Prof. H. Urey of Columbia. Presumably this is also the opinion of the Yale investigators.

The frog's heart, when placed in a solution made up with ordinary water, beat at the rate of ten beats in slightly over eleven seconds. In the same solution made up with heavy water, the rate was over 16 seconds for ten beats. Further experiments continued to show this slowing effect of the heavy water. In each case, the effect of the heavy water was similar to that produced by a lowering of temperature, the Yale investigators state.

The effects of the heavy water are what would be expected, they point out, because of the lower energy content of chemical systems involving heavy hydrogen.

Science News Letter, April 13, 1935

AGRICULTURE

If Cows Have No Hay, Let Them Eat Potatoes

FEED low-price potatoes and cabbage to cows to replace part of their too-expensive hay, is the recommendation of the extension service of the New York State College of Agriculture at Cornell University. Price ratios, based on the comparative nutritive values of the "garden-sass" substitutes, show when they become less expensive than hay as cattle feed.

Science News Letter, April 6, 1935

ARCHAEOLOGY

Turning Back Time

Archaeologist Makes It Possible For You To Journey Out of Twentieth Century to Mesopotamia, 3000 B.C.

By EMILY C. DAVIS

EVER AMUSE yourself wishing for a vacation from the twentieth century? Actually get back to one of those long-ago times that seem so much more romantic than this prosaic Age of Efficiency and Gadgets?

If so, with all the glamorous places of the past to choose from—ancient cities of Greece, amazing scenes of Egypt, castles of knighthood days in England—did you ever, honestly, think of saying:

"I'll take a ticket to Mesopotamia, please, and make it about 3000 B. C."?

A hundred to one, you never did.

But that is only because Mesopotamia 3000 B. C. has never been revealed until now, says Prof. E. A. Speiser, University of Pennsylvania archaeologist. If he could choose, he would go straight back there, not stopping off at any of the alluring points, not even to see Cleopatra meet Antony, nor to help Alexander the Great celebrate any victories.

For if the trip could be managed, he could witness one of the major events in the long drama of human progress. He would see how man escaped from a million years of the slow, chrysalis stage of being prehistoric. He would be there to see with his own eyes mankind stepping out into the enlightened era of history.

That was one of the exciting times to be alive in the world, says Prof. Speiser. Finding that thoughts and speech could be written down for other people to read miles away, years afterward, was a discovery so big that it swept people up into a different way of living. And just about the same time came another cultural bombshell—the Age of Metals. Then the first industrial revolution happened.

Nothing Else Like It

Life changed so radically that Prof. Speiser declares:

"Nothing like it is seen again until we get down to within earshot, so to speak, of our own times."

It is only because Ur and Kish and Tepe Gawra and other great cities of that age stayed buried so long, that the public dropped them out of its wishing journeys.

Mark Twain knew nothing of the adventurous possibilities of Mesopotamia 3000 B. C., when he chose to let his roving imagination carry him, as a Connecticut Yankee, back to King Arthur's court. A bewildered Yankee, trying to introduce modern improvements into cities along the Tigris and the Euphrates, could have had amusing experiences, worthy of a Mark Twain pen. But Mark lived too soon to write that tale.

Even today, only the archaeologists know very much about that life of 5,000 years ago. And the greater part of their knowledge has been dug up in the past ten years.

Right now is Mesopotamia's comeback. Twelve years of unearthing Ur of the Chaldees ended last year, and that job is done. Kish has been dug out in ten years of hard work, beginning 1923. Tepe Gawra is still news, for a dispatch only a few weeks ago tells of deeper layers being probed there, and another thousand years of antiquity seem likely to be added to a city that already is known from 3700 B. C.

Make City Live Again

The expeditions, digging persistently, often wearily, through thick blankets of earth over the humps of ruins, are carried along by the thrill of what they are doing for history. When they hold in their hands some crushed bowl or tissue-frail golden headdress, or tarnished dagger, they can see the ash-can object vividly in their minds as it once looked, fresh and restored to its proper setting in life.

These faded and broken relics and the maze-like stumps of buildings, interpreted through the knowledge of experts, are making Mesopotamia real again. And the country has a charm of novelty and strangeness that, Prof. Speiser believes, will more and more capture the public's fancy, just as it has already enthralled its discoverers.

At about 3000 B. C.—the time Prof. Speiser likes best—the stage in Mesopotamia is all set for important events. Suppose you arrive there ahead of time, as Prof. Speiser recommends. You choose an air survey of the Fertile Crescent first, to get your bearings.

PROF. E. A. SPEISER

He discovered the ancient city of Tepe Gawra, and recommends "Mesopotamia 3000 B.C.," for excitement. He holds in his hand a beautiful little chalice used in that great age.

A bird's eye view shows a surprising number of flat-roofed cities scattered over the plain, along both sides of the parallel streams, the Tigris and the Euphrates. The cities are set artificially high on platforms of earth, a "foreign" looking feature. The flood protection commission, or whatever the city fathers call it, has seen to raising the streets. Mesopotamia remembers one great Deluge, centuries back, when the Euphrates buried cities like Ur under eight feet of barren mud.

You can walk in imagination in a number of the cities to study their personalities, by archaeological knowledge. But the ones you would probably ask for first would scarcely be worth touring. Babylon is not yet on the map and Nineveh is still in the country town stage in 3000 B. C.

Tepe Gawra—Prof. Speiser's pride because he discovered it and worked there himself—is quite a place to see in the year 3000. For centuries it has had

city planning, its residential district, market section, temple area. Its residential streets are lined with bay-window brick houses. The whole town is brick. All Mesopotamia is built of brick, for stone is not one of the land's resources, and mud decidedly is. Chariot traffic rolls down the streets with the creaking of copper and wood disk wheels and the clattering hoofs of asses, horses, and oxen.

Temple on Platform

Tepe Gawra has not set its temples high on terraced platforms. But go south to Kish or Erech and you can see a temple like that, and it is worth taking in. It is a novel thought in religious architecture, and destined to become traditional through the Babylonian, Assyrian, and Chaldean eras. The idea is invented by Sumerian immigrants who are the dominant race in Mesopotamia about 3000 B. C. Coming from the mountains, they feel desperately far from heaven in the flat plains, so they begin building terraces for their temples. A few centuries hence, Ur will raise one of these imposing ziggurats or stage-towers. And later still Babylon will build its Tower of Babel, same style. Even in 1935 A. D., church steeples will be reaching skyward by the same old Mesopotamian custom.

Art work displayed in city market places is worth close examination. Goldsmiths display delicate flower-ornaments for women's hair, and all sorts of jewelry. Inlay artists work patterns in shell to make beautiful household things. Copper workers cut metal as if it were lump stone, hammering out blades and nails and kitchen pots. The artisans are exceptionally clever with clay, making images, for example, that are decidedly modernistic, as the world 5,000 years hence will use that superior-sounding term. The art of painted pottery is at a higher stage in these Sumerian cities than it will be again until the Greeks come along over 2,000 years later, with their genius for vase painting.

If you have time to detour to visit ruins, the Mesopotamians of 3000 B. C. can take you out to Jemdet Nasr, a city already abandoned. Or to old Shirrupak, traditional city where the Sumerian Noah, Zi-ud-su-du, is said to have built an ark and escaped a Deluge.

People Shadowy

Impressive as all the sight-seeing is, the people and cities remain shadowy in some ways. Remember, you are seeing only what the archaeologists can help you to see, by honest magic. That means you cannot talk with these people. The archaeologist does not know what their speech was like. They are prehistoric. They cannot communicate to the future —except through human memories—the names of their kings, the dates of their wars, or the crises of their history. Crude and obscure pictographs they do use to help remember facts and figures. But writing is not yet the universal key to communication that it is going to be—soon.

Says Prof. Speiser:

"When, by 3000 B. C., a complete system of writing is evolved, then history begins.

"When we learn that the first independent ruler of the city of Ur was a certain Mesannipadda, that the language he spoke was Sumerian, that he made war on the people of Erech, and that he gave costly presents to his wife, whom he mentions by name, we realize at once that quiet and anonymity have departed forever, and history is upon us in full sway. It all began the moment the past had broken its silence."

Literary Revolution

Now as you watch the changing events in the cities, you see a literary revolution.

Kings no longer need depend on ministers and criers to reach their public. They take to dictating grandiloquent statements, which they order carved on stone monuments, or clay tablets, or even on cliffsides. The satisfaction of being royal deepens, now that a king can tell the world his mighty doings forever.

Statecraft becomes more modern, as demands and agreements can be written with strokes of a stylus in damp clay and referred to later from the official files. The first peace treaty is written somewhere about this time. But judging by one of these treaties found 5,000 years later, putting promises in writing is no international cure-all. This early treaty—2900 B. C.—signed by the cities of Lagash and Umma after a bitter civil war, sets down emphatic terms and even threatens a curse if the vanquished people of Umma dare to break the terms. But soon after, the treaty is just a scrap of clay for all the battling cities think of it.

Business dealings become more systematic with the aid of writing. The temple priests who do a big business in tribute payments, rendered in terms of live stock, grain, and other goods, build up efficient office records, kept on thousands of small clay tablets.

School Books

School books are written, for some one soon discovers how helpful they would be. On clay bricks, the priest-schoolmasters of Nippur and other cities write lessons to be studied. What lessons? Not much different from lessons thousands of years later—grammar rules, multiplication exercises, history dates and names of kings, geography facts.

The old art of sending verbal messages becomes the new art of letter writing. And these people with their newfound literary accomplishments write business letters and love letters just about like those of later ages. Even the little

FROM A KITCHEN

A copper frying pan of Tepe Gawra. Blades and nails, as well as kitchen things were hammered from this metal.

touches "keep well for my sake," and "I went to Babylon but did not see thee; I was greatly disappointed," appear near the dawn of letter writing.

As for the industrial revolution, brought in by metals, Prof. Speiser says:

"When copper first finds its way into the principal centers of the ancient world, late in the prehistoric period, no one can suspect that the first great industrial revolution will be made of just this sort of reddish stuff.

"To the craftsmen who hammer it into shape, the metal is merely a costly substitute for stone; a rarity and nothing more, incapable of disturbing the even tenor of contemporary life.

"But at length the discovery is made that when the metal has been reduced and then remelted, it can be cast so as to yield any desired shape. No longer like rigid stone, the copper becomes pliable and strangely responsive. In other words, some one has stumbled upon the basic principles of metallurgy.

"Event follows upon event with alarming rapidity. Home industries receive a powerful impetus. Foreign contacts acquire a new meaning. Stone users are no match in battle with the wielders of the new copper weapons. Possession of the metal becomes a stark necessity, and, since the known mines are limited in number and restricted to a few locations, there is a mad scramble to control the sources of supply. Distances are disregarded in the search for new deposits. In the heat and dust of this upheaval whole nations are shifted and transplanted almost overnight.

"When the smoke has at last cleared it is an entirely different world that faces the unknown future; a restless world constantly on the move. Life is no longer, as it has so long been, peaceful and leisurely and on the whole uneventful."

Describing the scenes as they are eventually, in 1935, Prof. Speiser says:

SCENE OF ESCAPE

The Land of the Two Rivers, Mesopotamia, where man escaped from the chrysalis stage of being prehistoric, and stepped out into the enlightened era of history.

"You cannot mistake the main outlines of the historic revolution, once you have been fortunate enough to excavate such a place. First you are impressed by the beauty and restraint of the prehistoric civilizations. Then you come to a place where these come to an end. A few feet of earth, and you have ascended to a different world. Across that enormously significant border are the foundations of modern life. Great wealth and industry and skill, and with it all a feeling that everything is somehow in a state of flux. And the ground is green with copper."

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PHYSICS

Stratosphere's Height Above Earth Found To Be Variable

STRONG evidence that the base of the stratosphere varies greatly in height is contained in preliminary results of the Massachusetts Institute of Technology's recent sounding balloon investigation of weather conditions as high as 15 miles above the earth.

Investigations so far completed of the sensitive instruments carried aloft at St. Louis, Mo., a few months ago indicate that the base of the stratosphere suddenly shifts in height in ranges varying from 25,000 feet (4.7 miles) to 40,000 feet (7.5 miles), according to Prof. Carl G. A. Rossby, meteorology director at the Institute.

Extraordinary fluctuations in temperature, ranging from 36 degrees below zero Fahrenheit to 78 degrees below, were also recorded at the base of the stratosphere, that layer of the atmosphere where temperature no longer decreases with greater height.

Temperature, humidity and air pressure readings were automatically made during active storm conditions by means of highly sensitive, featherweight instruments carried by the balloons. Swelling as they rose until they burst in the rarefied air of the stratosphere, the balloons then parachuted the instruments to earth where they landed safely in shock-absorbing split-bamboo frames.

Find 29

Of the 35 balloons released last November, 29 were found within 100 miles of St. Louis and returned to the Institute, where their precious instruments have been partially calibrated by Prof. Rossby.

From these studies, scientists hope to learn, among other things, whether violent changes in the stratosphere accompany temperature fluctuations and at what approximate level the greatest cold is found.

While the data previously obtained are still being studied, another investigation, the third, is planned for next week, provided that weather conditions are favorable. Since these investigations are being carried on under active storm conditions, "favorable" in this case, means the worst possible.

Chris Harmantas, who is in charge of field operations, has already left for St. Louis with 36 new sounding balloons.

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BELIEVED HIM TO BE NIMROD

The first archaeologist to find the site of Nineveh describes the discovery of a gigantic statue in the temple gateway. (Layard, "Nineveh," SNL No. 529).

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BACTERIOLOGY

Soil's Invisible Life Makes National Wealth

BACTERIA and other microorganisms, swarming in innumerable billions in the soil, make or mar national existence, Dr. Charles Thom of the U. S. Department of Agriculture said in an address under the auspices of Science Service.

More is known about the invisible life of the soil than formerly but it is still only a fraction of what is needed to be known if the nation is to get the best out of its fields and forests, or even to prevent absolute disaster through wasting of fertility resources or the actual vanishing of the soil itself through water erosion and dust storms, he declared.

"Decay" is a word carrying disagreeable connotations, but, Dr. Thom pointed out, this breaking-down process, which in the end brings to the same level the proudest emperor and the sweepings from the poorest peasant's stable, is an absolute necessity if new life is to be born into the world and prosper in its appointed cycle. Dead and discarded things must go back to the soil from whence they came, if new growth is to spring from that soil.

Bacterial and fungal appetites, omnivorous and thriving on things that are rank poison to mankind, prove useful in clearing the soil of what might otherwise be very harmful substances, the speaker pointed out. An estimated quantity of 80 million pounds of arsenic is used in this country, mostly to kill insects. Much of this is wasted—falls to the ground, where it might make trouble, but for the fact that a whole series of molds change it from insoluble to soluble and volatile forms, in which it can do no more harm. The same is true of poisonous selenium salts, also used in insecticide sprays.

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ECOLOGY

NATURE RAMBLINGS
by Frank Thone

Drought and the Ten Plagues

PASSOVER this year begins on next Thursday, April 18, which is Nisan 15 by the ancient Hebrew reckoning. This great Jewish feast, celebrating the flight of the Children of Israel from the rule of an hostile and oppressive government many centuries ago, rouses speculation with a decidedly modern slant.

Drought, we know, had sent the Israelites into Egypt, generations earlier, when a more favorably-disposed dynasty held the throne. Did drought have anything to do with their departure from the land? Was there drought in Egypt when the Ten Plagues broke the hard heart of Pharaoh, so that he let Israel go?

Unless one wishes to set all the Egyptian plagues down as direct interventions of supernatural power, and hence not subject to further discussion, there are some hints in the account as given in Exodus, VII-XII, that may serve as a basis for interesting conjecture.

One of the most notable of the ten plagues, the locusts, are normally an added affliction that goes with drought years, as any farmer in our own West can testify. The "darkness" that came after the locusts may possibly have been one of the terrible sun-obscuring desert sandstorms that sometimes rage for days, as dust storms this spring did in America. The plague of hail, which preceded the locusts as the darkness followed them, is again something that may occur naturally in a hot summer, even when there is drought.

The other plagues point less directly at drought conditions, yet they may have been indirectly due to water shortage in the Nile. The "blood" that filled the river, and was the first of the plagues, may possibly have been a swarming growth of one-celled red-hued plants or animals, such as sometimes occurs in hot weather.

The plague of frogs that followed may have been simply these animals fleeing from uninhabitable water, lest they should die therein as the fish had died. The heaps of dead fish and frogs that "stank" could easily account for the subsequent plague of flies. The "lice" swarming from the dust may be a mistranslation for fleas or other itchy vermin natural to dry sand and soil.

And with the water supply short, and Eastern sanitation of the fifteenth century B. C., the arising of a "murrain of the cattle" and "boils and blains" on the populace generally, followed finally by a deadly epidemic among the children—perhaps of typhoid fever or dysentery—forms an easily imaginable picture.

Small wonder that the Children of Israel wanted to get out of the country!

Science News Letter, April 13, 1935

PSYCHOLOGY

Russians Putting Psychology To Work for Industry

A THOUSAND psychologists in over 200 laboratories, some of them mobile, are selecting, classifying and training Soviet Russia's man power for better industrial service, Prof. Florien Heiser of Connecticut State College found during a trip-survey of the U. S. S. R.'s psychological research, now being analyzed and studied with an eye to American conditions.

With no industrial psychology before the revolution, the U. S. S. R. now has a Union of Psychotechnicians that includes over a thousand trained psychologists.

Each republic has its central laboratory, and branches have been established in all large industrial groups. The central office of the railways has a special laboratory, and 26 laboratories-on-wheels in railway cars which tour the country to examine and offer guidance to workers and applicants.

Russia's industrial psychologists have not contented themselves with the analysis of job requirements and devising of tests for selecting the best fitted workers. They have been studying the effect on workers' efficiency of working hours, rest periods, lighting, ventilation, nutrition, and recreation.

A new interest in individual men and their interests is indicated by the shift in emphasis of the research of vocational psychologists since the spring of 1934.

Before that, the main idea was to find out how to fit men to the jobs. Now the purpose is to study the individuals and steer them into the professions or jobs for which they are best suited.

A large scale program of testing and counseling in the secondary schools is being undertaken for the purpose, not of making men conform to jobs but of finding the right jobs for the men.

"As a psychologist, one is naturally gratified in seeing such large scale applications in every field of social usefulness," Prof. Heiser commented.

Even though the basis of the Revolution was the improvement of the people through the improvement of their environment, and the Marxian theory stresses the great importance of environment and the unimportance of difference in birth or heredity, still Prof. Heiser found programs of research on heredity flourishing in Russia. The work being conducted by Profs. S. G. Levit and H. J. Muller, the latter formerly of the University of Texas, is well received and heavily subsidized.

Another important study is being made by the internationally known Prof. A. R. Luria on 350 pairs of identical twins. Identical twins are those in which both members have the same heredity, and are, therefore, particularly useful in studying the influence of environment.

Science News Letter, April 13, 1935

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First Glances at New Books

Astronomy—Physics

NEW PATHWAYS IN SCIENCE—Sir Arthur Eddington—*Macmillan*, 333 p., $3. Except for Eddington's small book on the Expanding Universe the present volume is the first from his pen since 1929. Sir Arthur admits he about wrote himself out at that time but now he returns to the field of popular writing on science with the benefit of a rest and much new material. Minus two chapters the book consists of Eddington's Messenger Lectures delivered at Cornell University last spring. With chapters on the End of the World, The Decline of Determinism, Quantum Theory, Probability and Star Constitution Eddington goes on into The Theory of Groups when he says, "We need a super-mathematics in which the operations are as unknown as the quantities they operate on, and a super-mathematican who does not know what he is doing when he performs these operations. Such a super-mathematics is the Theory of Groups." All of which is Sir Arthur's pleasing way of discussing how physicists today start their calculations and hypotheses by assuming only the bare essentials and arrive at formulae which help research by correctly predicting results, but which leave them without a "real" leg to stand on.

Science News Letter, April 13, 1935

Periodicals

YOUNG AMERICA: VOL. 1, No. 1, MARCH 8, 1935—*Eton Publishing Corp., New York*, Weekly, $3 per year. Well illustrated, and more like a magazine than a newspaper, this publication for young readers covers a wide field of interests in an interesting style.

Science News Letter, April 13, 1935

Periodicals

THE BOYS' AND GIRLS' NEWSPAPER; VOL. 1, NO. 3, MARCH 10, 1935—*Parents' Magazine Affiliated Press, Inc., New York*, Weekly, 7c. per copy, $3. per year. A weekly newspaper bringing the news of the world to the younger members of the family. It is complete with housekeepers' page, movie reviews, and, of course, science news.

Science News Letter, April 13, 1935

Archaeology

ANNUAL OF THE AMERICAN SCHOOLS OF ORIENTAL RESEARCH, VOL. XIV, FOR 1933-34—*American Schools of Oriental Research*, 144 p., $2.50. Prof. Nelson Glueck's archaeological survey of Transjordan, and his reconstruction of events in the land of Moab, make up the larger part of this annual. There is also a discussion of the Book of Nehemiah as a source for locating gates and walls of Jerusalem, by Millar Burrows, and a note on an Aramaic incantation of about the seventh century A. D., presented by Cyrus H. Gordon.

Science News Letter, April 13, 1935

Education

STATISTICS OF HIGHER EDUCATION, 1931-32—U. S. Office of Education—*Government Printing Office*, 401 p., 25c. A report of statistics gathered three years ago. This publication is chapter III of the Biennial Survey of Education and concerns American institutions of higher learning.

Science News Letter, April 13, 1935

Book Publishing

ONE HUNDRED AND FIFTY YEARS OF PUBLISHING, 1785-1935—*Lea & Febiger*, 42 p., free. (Obtainable through *Science Service* if 10c. handling charge is sent). The interesting history of one of America's oldest publishing houses, first established by Mathew Carey through a loan from the Marquis de La Fayette. The business has been handed down from father to son during the century and a half of its operation.

Science News Letter, April 13, 1935

History of Agriculture

THE AGRICULTURAL FAIR—Wayne Caldwell Neely—*Columbia University Press*, 313 p., $3.75. The State or County fair, with its hippopotamine hogs, its behemoth beeves, its sideshows and its trotting races, is a glamorous memory to all Americans with even a trace of rural background. But it has also been a solid contributor to the advance of American agriculture and rural life, and as such merits the serious treatment of its history and development which it receives in this book. There is an astonishingly full bibliography—23 pages of it—and there are many interesting full-page illustrations.

Science News Letter, April 13, 1935

Physics

SOUND: A PHYSICAL TEXTBOOK—E. G. Richardson—*Longmans, Green*, 319 p., $5.50. The second edition of this widely used textbook on sound finds its value increasing. Intended for students about to start on graduate work it describes the mathematical needs of the field, the physical concepts and all the major "pure" research and technological applications. As before it discusses all the musical instruments. It is hard to find a single page which does not have a footnote referring to some paper in the literature of sound.

Science News Letter, April 13, 1935

Science Teaching

THE SCIENCE COUNSELOR—*Duquesne University Press*, Quarterly, $1 per year; Canada, $1.25. A new journal devoted to the advancement of science teaching in Catholic high schools. There are leading articles on subject matter and teaching methods, illustrated accounts of "make-it-yourself" devices and apparatus constructed by students, discussion topics for teacher opinion, brief news notes and book reviews. *The Science Counselor* may well be read with profit by many teachers outside the denominational limits it sets for itself.

Science News Letter, April 13, 1935

Natural History

BUTTERFLIES AND MOTHS OF AMERICA—Lillian D. Fazzini—95 p.; WILD FLOWERS OF AMERICA—Jane Harvey—95 p.; THE RED BOOK OF BIRDS OF AMERICA—Frank G. Ashbrook—95 p.; TREES YOU WANT TO KNOW—Donald C. Peattie; *Whitman Publishing Co.*, 10c. each. A series of vestpocket-size booklets in tough paper covers, very handy to carry in the field. Each gives condensed text description and small colored figures for several score of the more familiar species with which it deals.

Science News Letter, April 13, 1935

Engineering

TRANSACTIONS, INSTITUTE OF METALS DIVISION, 1934—*American Institute of Mining and Metallurgical Engineers*, 379 p., $5.

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